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SWADEY OGDON CENALT
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A.M.
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2175731

U.S.A. (08/435,798) 19950504

Proprietor - Owner
Demcor, Howard W.

Inventeur - Inventor
DeMoore, Howard W.; Rendleman, Ronald M.;
Bird, John W.

Retractable Inking/Coating Apparatus Having Ferris Movement Between Printing Units

Ogilvie & Company
Edmonton, Alberta

OPAC - CIPD 138 (12-85)

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ה'תשנ"ז

[illegible]

060501-0501

REPORTS AND AMENDMENTS - RAPPORTS ET AMENDEMENTS

[illegible]

CLAIMS AT ALLOWANCE	CLAIMS AT EDITORIAL
REVENDEICATIONS A L'ACCEPTION	REVENDEICATIONS A L'ÉDITION

ALLOWED - ACCEPTÉE

SIGNATURE OF EXAMINER - SIGNATURE DE L'EXAMINATEUR

WITHDRAWN FROM ALLOWANCE - RETIREE DE L'ACCEPTATION

RESTORED OR REINSTATED - RESTAURÉE OU RETABLIE

SECOND ALLOWANCE - REACCEPTATION

SIGNATURE OF EXAMINER - SIGNATURE DE L'EXAMINATEUR

**ABANDONED / LAPSED DUE TO MAINTENANCE FEE
ABANDONNÉ / DUE A LA TAXE DE MAINTIEN**

SELECT LIST DEFAULT:

SELECT# RESULTS TERM

1 1 DEMOOR, STEPHEN J./IN
2 19 DEMOORE/PA
3 19 DEMOORE, HOWARD W./IN
4 3 DEMOPOLIS/IN
5 2 DEMOPOLIS, TOM N./IN
UP N OR DOWN N?

sel 3

SS 1 RESULT (19)

SS 2?

prt ti pn 1-19

-1- (USPA)

TI - Retractable printing/coating unit operable on the plate and blanket cylinders simultaneously from the dampener side of the first printing unit or any consecutive printing unit of any rotary offset printing press
PN - US5651316

-2- (USPA)

TI - Method and apparatus for handling printed sheet material
PN - US5603264

-3- (USPA)

TI - Retractable printing/coating unit operable on the plate and blanket cylinders
PN - US5598777

-4- (USPA)

TI - Delivery conveyor with control window ventilation and extraction system
PN - US5540152

-5- (USPA)

TI - Method and apparatus for handling printed sheet material
PN - US5511480

-6- (USPA)

TI - Vacuum transfer apparatus for rotary sheet-fed printing presses
PN - US5419254

-7- (USPA)

TI - Automatic coating circulation and wash-up system for printing presses
PN - US5367982

-8- (USPA)

TI - Coating apparatus for sheet-fed, offset rotary printing presses
PN - US5335596

-9- (USPA)

TI - Vacuum transfer apparatus for rotary sheet-fed printing presses
PN - US5243909

-10- (USPA)

TI - Vacuum transfer apparatus for rotary sheet-fed printing presses
PN - US3228391

-11- (USPA)
TI - Coating apparatus for sheet-fed, offset rotary printing presses
PN - US5207159

-12- (USPA)
TI - Vacuum transfer apparatus for rotary sheet-fed printing presses
PN - US5205217

-13- (USPA)
TI - Coating apparatus for sheet-fed, offset rotary printing presses
PN - US5176077

-14- (USPA)
TI - Vacuum transfer apparatus for rotary sheet-fed printing presses
PN - US5133255

-15- (USPA)
TI - Vacuum transfer apparatus for rotary sheet-fed printing presses
PN - US5127329

-16- (USPA)
TI - Net cartridge assembly for use with transfer and delivery cylinders in rotary printing presses
PN - US5046421

-17- (USPA)
TI - Anti-marking method and apparatus for use with perfecter cylinders of rotary sheet-fed printing presses
PN - US5042384

-18- (USPA)
TI - Method and apparatus for attaching anti-smear net to printing press transfer cylinder
PN - US4691632

-19- (USPA)
TI - Method and apparatus for handling printed sheet material
PN - US4402267

SS 2?

-3- (USPA)

PN - US5598777

TI - Retractable printing/coating unit operable on the plate and blanket cylinders

IN - DeMoore, Howard W., 10954 Shady Trail, Dallas (TX) US, 75220;
Rendleman, Ronald M., Dallas (TX) US; Bird, John W., Carrollton (TX) US

PA - DeMoore, Howard W., Dallas, TX, US

PD - 97.02.04

AP - 95.10.02 95US-538274

NO - 19 CLAIMS, EXEMPLARY CLAIM 1, 10 DRAWINGS, 18 FIGURES
EXAMINER: Fisher, J. Reed

ATTY/AGENT: Sidley & Austin

PCL - 101177000, CROSS REFS: 101352000

IC - B41F-005/02, B41F-005/22, B41F-031/36

FLD - 101/349.000, 101/350.000, 101/351.000, 101/352.000, 101/207.000,
101/208.000-101/210.000, 101/363.000, 101/364.000, 101/147.000,
101/148.000, 101/143.000, 101/144.000, 101/217.000, 101/218.000,
101/177.000, 101/247.000, 118/258.000-118/262.000, 118/046.000,
118/263.000

DT - INVENTION PATENT

FS - TO US INDIVIDUAL

CT - US4308796, 1/1982, Satterwhite, 101/350.

US4706601, 11/1987, Jahn, 118/211.

AB - A retractable in-line inking/coating apparatus can apply either spot or overall inking/coating material to a plate and/or a blanket on the first printing unit or on any consecutive printing unit of any rotary offset printing press. The inking/coating apparatus is pivotally mounted within the conventional dampener space of any lithographic printing unit. The aqueous component of the flexographic printing ink or aqueous coating material is evaporated and dried by high velocity, hot air dryers and high performance heat and moisture extractors so that the aqueous or flexographic ink or coating material on a freshly printed or coated sheet is dry and can be dry-trapped on the next printing unit. The inking/coating apparatus includes dual cradles that support first and second applicator rollers so that the inking/coating apparatus can apply a double bump of aqueous/flexographic or UV-curable printing ink or coating material to a plate on the plate cylinder, while simultaneously applying aqueous, flexographic or UV-curable printing ink or coating material to a plate or a blanket on the blanket cylinder, and thereafter onto a sheet as the sheet is transferred through the nip between the blanket cylinder and the impression cylinder. A triple bump is printed or coated on the last printing unit with the aid of an impression cylinder inking/coating unit.

MCLM- What is claimed is: 1. A rotary offset printing press of the type including first and second printing units, the first printing unit comprising:

a plate cylinder having a flexographic printing plate mounted thereon;

a blanket cylinder having a blanket disposed in ink or coating transfer engagement with the flexographic printing plate for receiving aqueous or flexographic printing ink or coating material from the flexographic printing plate;

an impression cylinder disposed adjacent the blanket cylinder thereby forming a nip between the blanket and the impression cylinder whereby the aqueous or flexographic printing ink or coating material can

be transferred from the blanket to substrate as the substrate is transferred through the nip;

inking/coating apparatus movably coupled to the first printing unit for movement to an on-impression operative position and to an off-impression retracted position;

the inking/coating apparatus including container means for containing a volume of aqueous or flexographic ink or coating material, and at least one applicator roller coupled to the container means for applying aqueous or flexographic ink or coating material to the flexographic printing plate or to the blanket when the inking/coating apparatus is in the on-impression operative position;

the container means having a partition dividing the container means thereby defining a first container region and a second container region;

the at least one applicator roller having first and second transfer surfaces and means separating the first and second transfer surfaces; and,

the first and second transfer surfaces of the at least one applicator roller being disposed within the first and second container regions for rolling contact with aqueous or flexographic printing ink or coating material contained within the first and second container regions, respectively.

SS 2?

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-1- (USPA)
PN - US5651316
TI - Retractable printing/coating unit operable on the plate and blanket cylinders simultaneously from the dampener side of the first printing unit or any consecutive printing unit of any rotary offset printing press
IN - DeMoore, Howard W., 10954 Shady Trail, Dallas (TX) US, 75220; Rendleman, Ronald M., Dallas (TX) US; Bird, John W., Carrollton (TX) US

PA - DeMoore, Howard W., Dallas, TX, US

PD - 97.07.29

AP - 95.10.02 95US-538123

no corresponding Canadian

NO - 16 CLAIMS, EXEMPLARY CLAIM 1, 10 DRAWINGS, 18 FIGURES

EXAMINER: Eickholt, Eugene H.

ATTY/AGENT: Sidley & Austin

PCL - 101450100, CROSS REFS: 118046000, 101424100

IC - B41M-004/00

FLD - 101/424.100, 101/450.100, 101/135.000, 101/141.000, 101/142.000, 101/211.000, 101/216.000, 101/232.000, 101/348.000-101/349.000, 118/046.000

DT - INVENTION PATENT

FS - TO US INDIVIDUAL

CT - US3397675, 8/1968, De Lig, 118/258.

US3433155, 3/1969, Norton, 101/148.

US3768438, 10/1973, Kumpf, 118/262.

US3860743, 4/1974, Egnaczak, 118/259.

US3916824, 11/1975, Knodel et al., 118/224.

US3931791, 1/1976, Preuss et al., 118/236.

US4222325, 9/1980, Edwards, 101/137.

US4270483, 6/1981, Butler et al., 118/46.

US4372244, 2/1983, Rebel, 118/46.

US4397237, 8/1983, Makosch, 101/352.

US4399767, 8/1983, Simeth, 118/46.

US4421027, 12/1983, Fischer, 101/142.

US4423677, 1/1984, Fischer, 101/232.

US4446814, 5/1984, Abendroth, 118/694.

US4501223, 2/1985, Matsuno et al., 118/668.

US4524712, 6/1985, Ito, 118/46.

US4536218, 8/1985, Ganito, 101/450.1.

US4569306, 2/1986, Ito et al., 118/249.

US4615293, 10/1986, Jahn, 118/46.

US4685414, 8/1987, DiRico, 118/46.

US4706601, 11/1987, Jahn, 118/46.

US4779557, 10/1988, Frazzitta, 118/46.

US4796528, 1/1989, Sarazen, 101/211.

US4796556, 1/1989, Bird, 118/46.

US4815413, 3/1989, Kota, 118/46.

US4825804, 5/1989, Kirico et al., 118/46.

US4841903, 6/1989, Bird, 118/46.

US4852515, 8/1989, Terasaka et al., 118/663.

US4934305, 6/1990, Koehler et al., 118/46.

US5107790, 4/1992, Sliker et al., 118/674.

US5176077, 1/1993, DeMoore et al., 101/232.

US5178678, 1/1993, Koehler et al., 118/46.

US5189960, 3/1993, Valentini, 101/349.

US5209179, 5/1993, Herbert et al., 118/46.

US5476041, 12/1995, Czotscher, 101/232.

AB - A retractable in-line inking/coating apparatus can apply either spot or overall inking/coating material to a plate and/or a blanket on the first printing unit or on any consecutive printing unit of any rotary offset

printing press. The inking/coating apparatus is pivotally mounted within the conventional dampener space of any lithographic printing unit. The aqueous component of the flexographic printing ink or aqueous coating material is evaporated and dried by high velocity, hot air dryers and high performance heat and moisture extractors so that the aqueous or flexographic ink or coating material on a freshly printed or coated sheet is dry and can be dry-trapped on the next printing unit. The inking/coating apparatus includes dual cradles that support first and second applicator rollers so that the inking/coating apparatus can apply a double bump of aqueous/flexographic or UV-curable printing ink or coating material to a plate on the plate cylinder, while simultaneously applying aqueous, flexographic or UV-curable printing ink or coating material to a plate or a blanket on the blanket cylinder, and thereafter onto a sheet as the sheet is transferred through the nip between the blanket cylinder and the impression cylinder. A triple bump is printed or coated on the last printing unit with the aid of an impression cylinder inking/coating unit.

MCLM- What is claimed is: 1. A method for printing in a rotary offset press of the type including first and second printing units, the first printing unit having a flexographic printing plate, a blanket, an impression cylinder and inking/coating applicator means for applying aqueous or flexographic printing ink or coating material to the flexographic printing plate and/or to the blanket, comprising the following steps performed in succession in the first printing unit:

- applying a first spot or overall coating of aqueous or flexographic printing ink or coating material to the flexographic printing plate;
- transferring the aqueous or flexographic printing ink or coating material from the flexographic printing plate to the blanket;
- applying a second spot or overall film of aqueous or flexographic printing ink or layer of coating material to the blanket;
- transferring ink or coating material from the blanket to a substrate as the substrate is transferred through the nip between the blanket and the impression cylinder; and,
- drying the aqueous or flexographic ink or coating material on the freshly printed or coated substrate before the substrate is printed, coated or otherwise processed on the second printing unit.

SS 2?

1060501

Ogilvie and Company
1400 Metropolitan Place
10303 Jasper Avenue
EDMONTON Alberta
T5J 3N6

MAR - 8 1999

Application No. : 2,175,731
Owner : DeMoore, Howard W.
Title : RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS
Classification : B41F-1/40
Your File No. : 7006.021
Examiner : Ewa Chmura-Nadeau

106050-96/STEE60

IN ACCORDANCE WITH SUBSECTION 30(2) OF THE PATENT RULES, YOU ARE HEREBY NOTIFIED OF A REQUISITION BY THE EXAMINER. IN ORDER TO AVOID ABANDONMENT UNDER PARAGRAPH 73(1)(A) OF THE PATENT ACT, A WRITTEN REPLY MUST BE RECEIVED WITHIN 6 MONTHS AFTER THE ABOVE DATE.

This application has been examined as originally filed.

The number of claims in this application is 22.

A search of the prior art has thus far failed to reveal any pertinent references. ←

The examiner has identified the following defects in the application:

Claim 18 is indefinite and does not comply with Subsection 27(4) of the Patent Act. The following terms have no antecedents:

"plate" (claim 18, line 23);
"blanket" (claim 18, line 1);
"inked or coated image" (claim 18, line 6); and
"nip" (claim 18, line 8).

In view of the foregoing defects, the applicant is requisitioned to amend the application in order to comply with the Patent Act and the Patent Rules or to provide arguments as to why the application does comply.

2,175,731

- 2 -

Under Section 29 of the Patent Rules, applicant is requisitioned to provide an identification of any prior art cited in respect of the corresponding United States and European Patent Office applications and the patent numbers, if granted. Amendment to avoid references cited abroad may expedite the prosecution. If the particulars are not available to the applicant, the reason why must be stated.

Ewa Chmura-Nadeau
Patent Examiner
(819) 997-2819
2175731A.ECN

09315796.050901
T06050.96757360

PETITION

Industrie Canada	Industry Canada
OPIC	CIPO
18	MAY 3 1996 18
Dossier File	
Remis à Chargé to	

15- The Petition of **HOWARD W. DeMOORE**, whose full post office
address is 10954 Shady Trail, Dallas, Texas 75220, U.S.A.

SHEWETH:

15- (1) THAT, Howard W. DeMoore, Ronald m. Rendleman and John W.
Bird, whose full post office addresses are (respectively) 10954 Shady Trail, Dallas,
Texas 75230, U.S.A.; 4331 Royal Ridge, Dallas, Texas 75229, U.S.A.; and 1514
Iroquois Circle, Carrollton, Texas 75007, U.S.A. made the invention entitled
RETRACTABLE INKING/COATING APPARATUS HAVING FERRIS MOVEMENT
BETWEEN PRINTING UNITS which is described and claimed in the specification
submitted herewith.

(1a) THAT the entire right to obtain a patent for the said invention has
been assigned to Your Petitioner.

(2) THAT your Petitioner verily believes that he is entitled to a patent
for the said invention having regard to the provisions of the Patent Act.

(2.1) THAT your Petitioner verily believes that he is entitled to pay a
filing fee as a small entity as defined in Section 2 of the Patent Rules.

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(3) Your Petitioners request that this application be treated as entitled to the rights accorded by Section 28(1) of the said Act having regard to the application of which particulars are set out below, and represents that the said application is the first application for patent for the said invention filed in any country which by treaty, convention or law affords similar rights to citizens of Canada by the inventors or any one claiming under him.

U.S. Patent Application No. 08/435,798 filed on May 4, 1995

US 95-05-04

(4) THAT your Petitioner hereby nominates OGILVIE AND COMPANY, carrying on business in Canada at the following address 1400 Metropolitan Place, 10303 Jasper Avenue, Edmonton, Alberta, T5J 3N6, to be his representative for the service of any proceedings taken under the Act.

(5) THAT your Petitioner hereby appoints OGILVIE AND COMPANY, having a post office address is 1400 Metropolitan Place, 10303 Jasper Avenue, Edmonton, Alberta, T5J 3N6, as his agent, with full power to appoint an associate agent when required to do so by Section 131 of the Patent Rules and to revoke such appointment, to sign the petition and drawings, to amend the specification and drawings, to prosecute the application, and to receive the patent granted on the said application; and ratify any act done by the said appointee in respect of the said application.

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(6) YOUR Petitioner therefore prays that a patent may be granted to him for the said invention.

SIGNED at Edmonton, Alberta, this 2nd day of May, 1996.

OGILVIE AND COMPANY

Per: *E. Peter Johnson*

E. PETER JOHNSON
Agents for the Applicant

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T06050.9675166



(21) (A1) 2,175,731
(22) 1996/05/03
(43) 1996/11/05

(51) Int.Cl. ⁶ B41F 1/40; B41F 3/81; B41F 7/36; B41F 15/40; B41F 5/24

(19) (CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Retractable Inking/Coating Apparatus Having Ferris
Movement Between Printing Units

(72) DeMoore, Howard W. - U.S.A. ;
Rendleman, Ronald M. - U.S.A. ;
Bird, John W. - U.S.A. ;

(71) DeMoore, Howard W. - U.S.A. ;

(30) (US) 08/435,798 1995/05/04

(57) 22 Claims

0315796-05004
106050-3625760

Notice: This application is as filed and may therefore contain an
incomplete specification.



"RETRACTABLE INKING/COATING APPARATUS
HAVING FERRIS MOVEMENT BETWEEN PRINTING UNITS"

ABSTRACT

A retractable in-line inking/coating apparatus selectively applies either spot or overall ink/coating material to a blanket or flexographic plate on a blanket cylinder, or spot or overall ink/coating to a flexographic printing plate on a plate cylinder in a rotary offset printing press. The inking/coating apparatus is pivotally mounted on the tower of a printing unit or dedicated coating unit, and is extendable into and retractable out of an inking/coating position by a carriage assembly which is pivotally coupled to the printing unit tower. Because of the pivotal support provided by a cantilevered support arm, the inking/coating apparatus is extended and retracted through a Ferris wheel arc between adjacent printing units.

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"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"

This invention relates to sheet-fed or web-fed, rotary offset or flexographic printing presses, and more particularly, to a new and improved inking/coating apparatus for the in-line application of printing inks or protective or decorative coatings to sheet or web substrates.

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Conventional sheet-fed, rotary offset printing presses typically include one or more printing units through which individual sheets are fed and printed with wet ink. Since the inks used with rotary offset printing presses typically remain wet and tacky for some time after printing, special precautions must be taken to insure that the freshly printed sheets are not marked or smeared as the sheets are transferred from one printing unit to another, and while being conveyed to the sheet delivery stacker. The printed surface of the freshly printed sheet dries relatively slowly and can be smeared during subsequent transfer between printing units. In order to reduce smearing and offsetting, spray powder is applied on the printed sheet.

25
In some printing applications, offset and smearing are prevented by applying a protective and/or decorative coating over all or a portion of the freshly printed sheets. Various arrangements have been proposed for applying the protective or decorative coating as an in-line operation by using the last printing unit of the press as the coating application unit. However, when such in-

line coating is performed, the last printing unit cannot be used to apply ink to the sheets, and can only be used for the coating operation. Thus, while coating with these types of in-line coating apparatus, the press loses the capability of printing its full range of colors since the last printing unit is converted to a coating unit.

It will be appreciated that the time required to reconfigure a press for coating or non-coating is non-productive and costly. Accordingly, there is a need for an in-line coating apparatus that minimizes the time to clean-up from one printing run and set-up and run the next job. Where consecutive jobs require the same type of coating, particularly blanket coating, it may not be necessary to clean-up the coater between jobs. However, the coating material cannot be allowed to dry on the rollers. Therefore, especially when switching from blanket to spot coating or vice versa, or if there is a delay between jobs, it is necessary to wash-up the coater after each job is completed.

In addition, coater wash-up is necessary when switching between different coating compositions, such as aqueous and ultra violet (UV) curable coatings. Such coating materials are not interchangeable, and consequently, the coater must be washed between applications of different coating media.

The foregoing limitations are overcome, according to the present invention, by a retractable, in-line inking/coating apparatus which is mounted on a printing

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unit for pivotal, Ferris wheel movement between an operative inking/coating position and a retracted, overhead idle position. The inking/coating apparatus includes an applicator head which, is positioned in alignment with either the plate cylinder or the blanket cylinder by a carriage assembly which includes a cantilevered support arm. The support arm is pivotally coupled between the inking/coating head and the printing unit tower. This cantilevered, pivotal mounting arrangement allows the inking/coating unit to be used between two printing units, as well as on the last printing unit of the press.

In the preferred embodiment, the applicator head includes vertically spaced pairs of cradle members with one cradle pair being adapted for supporting a metal or ceramic coating roller in alignment with a blanket cylinder, and the other cradle pair supporting a resilient anilox coating roller in alignment with the plate cylinder, respectively, when the carriage assembly is in the operative position. Because of the cantilevered, pivotal support provided by the support arm, the applicator head can be lifted and lowered through an arc, similar to Ferris wheel movement, in the limited space between adjacent printing units. When fully retracted, the applicator head and carriage assembly are lifted to an elevated, retracted overhead position, preferably an overhead position overlying the printing unit tower, thus providing complete access to the interstation space and the printing unit cylinders without causing the printing unit to lose its printing capability. The

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inking/coating applicator roller of the applicator head can be inspected, cleaned or replaced and the doctor blade assembly can be washed-up automatically while the inking/coating apparatus is in the retracted position.

5 When the inking/coating apparatus is used in combination with a flexographic printing plate and aqueous ink or aqueous coating, the water component of the aqueous ink or coating on the freshly printed sheet is evaporated by a high velocity, hot air interstation dryer and a high volume heat and moisture extractor assembly so that the
10 freshly printed ink or coating is completely dry before the sheet is printed on the next printing unit. This quick drying flexographic printing/coating arrangement permits a base coat of ink, for example opaque white or metallic ink
15 (gold, silver or other metallics) to be applied in the first printing unit, and then overprinted by a lithographic process on the next printing unit.

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5 Broadly stated, the invention is an inking/coating apparatus for use in a printing press of the type having a printing unit on which a plate cylinder, a blanket cylinder and an impression cylinder are mounted for rotation, wherein the inking/coating apparatus is characterized by: an applicator head for applying ink or coating material to a plate mounted on the plate cylinder or to a blanket mounted on the blanket cylinder, either separately or simultaneously when the inking/coating apparatus is in an operative position relative to the plate and blanket cylinders; and, a carriage assembly for moving the applicator head to the operative position in which the applicator head is disposed laterally adjacent to the plate and blanket cylinders and for moving the applicator head from the operative position to a retracted position in which the applicator head is elevated with respect to the plate and blanket cylinders.

20 In another broad aspect, the invention is a method for rotary offset printing in a printing press of the type including first and second rotary offset printing units, and using aqueous or UV-curable printing ink or coating material in the operation of at least the first printing unit, characterized by the following steps performed at each printing unit in succession: spot or overall coating the plate with aqueous ink/aqueous coating material or UV-curable ink/UV-curable coating material; spot and/or overall coating the blanket with aqueous ink/aqueous coating material or UV-curable

ink or UV-curable coating material; transferring the printing
ink or coating material from the printing plate to the blanket;
transferring the inked or coated image from the blanket to a
substrate as the substrate is transferred through the nip
5 between the impression cylinder and the blanket; and, drying
the ink or coating material on the freshly printed substrate
before the substrate is subsequently processed.

Exemplary embodiments of the present invention are
illustrated in the drawing figures wherein:

10 FIGURE 1 is a schematic side elevational view of a
sheet-fed, rotary offset printing press having inking/coating
apparatus embodying the present invention;

15 FIGURE 2 is a perspective view of the printing press
of FIGURE 1 in which a dual head inking/coating apparatus is
in the operative coating position and a single head coater is
in a retracted, overhead position;

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FIGURE 3 is an enlarged simplified perspective view showing one side of the single head inking/coating apparatus of FIGURE 1 in the operative position;

FIGURE 4 is a simplified side elevational view showing the dual head inking/coating apparatus in the operative coating position for spot or overall coating from the blanket position;

FIGURE 5 is a simplified side elevational view showing the single head inking/coating apparatus in the operative coating position for spot or overall coating from the plate position; and,

FIGURE 6 is a simplified side elevational view of the dual head inking/coating apparatus of FIGURE 4, partially broken away, which illustrates the hydraulic drive assembly and doctor blade assembly.

As used herein, the term "processed" refers to various printing methods which may be applied to either side of a substrate, including the application of UV-curable and aqueous inks and/or coatings. The term "substrate" refers to sheet or web material. Also, as used herein, the term "waterless printing plate" refers to a printing plate having non-image surface areas which are hydrophobic and also having image surface areas which are hydrophilic, wherein the non-image surface areas are characterized by a surface tension value which is less than the surface tension of aqueous ink, and the image surface areas are characterized by a surface tension value which is greater than the surface tension of aqueous ink. "Flexo-

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graphic" refers to flexible printing plates having a relief surface which is wettable by aqueous ink or aqueous coating material.

As shown in the exemplary drawings, the present invention is embodied in a new and improved in-line inking/coating apparatus 10, for applying inks or protective and/or decorative coatings to sheets or webs printed in a sheet-fed or web-fed, rotary offset or flexographic printing press, herein generally designated 12. In this instance, as shown in FIGURE 1, the inking/coating apparatus 10 is installed in a four color printing press 12, such as that manufactured by Heidelberger Druckmaschinen AG of the Federal Republic of Germany under its designation Heidelberg Speedmaster 102V. The press 12 includes a press frame 14 coupled at one end, herein the right end, to a sheet feeder 16 from which sheets, herein designated S, are individually and serially fed into the press, and at the opposite end, with a sheet delivery stacker 20 in which the freshly printed sheets are collected and stacked. Interposed between the sheet feeder 16 and the sheet delivery stacker 20 are four substantially identical rotary offset printing units 22, 24, 26 and 28 which can print different color inks onto the sheets as they are transferred through the press 12. The printing units are housed within printing towers T1, T2, T3 and T4 formed by side frame members 14, 15.

As illustrated, the printing units 22, 24, 26 and 28 are substantially identical and of conventional design.

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The first printing unit 22 includes an in-feed transfer cylinder 30, a plate cylinder 32, a blanker cylinder 34 and an impression cylinder 36, all supported for rotation in parallel alignment between the press side frames 14, 15.

5 Each of the first three printing units 22, 24 and 26 have an interunit transfer cylinder 38 disposed to transfer the freshly printed sheets from the adjacent impression cylinder to the next printing unit via an interstation transfer cylinder 40. The last printing unit 28 is shown
10 equipped with a delivery cylinder 42 which guides each freshly printed sheet 18 as it is transferred from the last impression cylinder 36 to a delivery conveyor system, generally designated 44, to the sheet delivery stacker 20.

15 The delivery conveyor system 44 as shown in FIGURE 2 is of conventional design and includes a pair of continuous delivery gripper chains 46, only one of which is shown carrying at regular spaced locations along the chains, laterally disposed gripper bars having gripper fingers for gripping the leading edge of a freshly printed
20 sheet 18 after it leaves the nip between the delivery cylinder 42 and impression cylinder 36 of the last printing unit 28. As the leading edge is gripped by the grippers, the delivery chains 46 pull the freshly printed sheet away from the impression cylinder 36 and deliver the freshly
25 printed sheet to the sheet delivery stacker 20.

Prior to reaching the delivery sheet stacker, the freshly printed and/or coated sheets S pass under a delivery dryer 48 which includes a combination of infra-red

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thermal radiation, high velocity hot air flow and heat and moisture extraction for drying the ink and/or the protective/decorative coating on the freshly printed sheets.

10
15
20
In the exemplary embodiment shown in FIGURE 1, the first printing unit 22 is equipped with a flexographic printing plate, and does not require an inking roller train or a dampening system. If an ink roller train is mounted on the first printing unit, the form rollers are retracted and locked off when the printing unit goes on impression. Flexographic aqueous ink is supplied by the inking/coating unit 110. The remaining printing units 24, 26 and 28 are equipped for lithographic printing and include an inking apparatus 50 having an inking roller train 52 arranged to transfer ink from an ink fountain 54 to the plate cylinder 32. This is accomplished with the aid of a fountain roller 56 and a ductor roller. The fountain roller 56 projects into the ink fountain 54, whereupon its surface is wetted with printing ink Q. The printing ink Q is transferred intermittently to the inking roller train 52 by the ductor roller. The inking roller train 52 supplies printing ink Q to the image areas of a printing plate P mounted on the plate cylinder 32.

25
The printing ink Q is transferred from the printing plate P to an ink receptive blanket B which is mounted on the blanket cylinder 34. The inked image carried on the blanket B is transferred to a sheet S as the sheet is transferred through the nip between the impression cylinder 36 and the blanket B.

The inking roller arrangement 52 illustrated in FIGURE 1 is exemplary for use in combination with lithographic ink printing plates. It will be understood that dampening rollers (not illustrated) will be in direct engagement with the lithographic plate P, but are not used in combination with the flexographic plate of printing unit 22.

Referring now to FIGURE 4, FIGURE 5 and FIGURE 6, the in-line inking/coating apparatus 10 includes a carriage assembly 58 which supports an applicator head 60. The applicator head 60 includes a hydraulic motor 62, a lower gear train 64, an upper gear train 65, an applicator roller 66 and a doctor blade assembly 68. The external peripheral surface of the applicator roller 66 is inserted into wetting contact with liquid coating material or ink contained in a reservoir 70. The reservoir 70 is continuously supplied with ink or coating which is circulated through the reservoir 70 from an off-press source by a pump (not illustrated). The hydraulic motor 62 drives the applicator roller 66 synchronously with the plate cylinder 32 and the blanket cylinder 34 in response to an RPM control signal from the press drive (not illustrated) and a feedback signal developed by a tachometer 72. While a hydraulic drive motor is preferred, an electric drive motor can be used.

The applicator roller 66 is preferably a fluid metering anilox roller which transfers measured amounts of printing ink or coating material onto the printing plate or

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blanket. The surface of an anilox roller is engraved with an array of closely spaced, shallow depressions referred as "cells". Ink or coating material from the reservoir 70 flows into the cells as the anilox roller turns through the reservoir. The transfer surface of the anilox roller is scraped with a doctor blade 73 to remove excess ink or coating. The ink or coating remaining on the anilox roller is the measured amounts contained within the cells.

The applicator roller 66 is cylindrical and may be constructed in various diameters and lengths, containing cells of various sizes and shapes. The volumetric capacity of an anilox roller is established during manufacturing and is dependent upon the selection of cell size, shape and number of cells per unit area. Depending upon the intended application, the cell pattern may be fine (many small cells per unit area) or coarse (fewer larger cells per unit area).

By applying the ink or coating material through the inking/coating applicator head 60, more ink or coating material can be delivered to the sheet S as compared with the inking roller train of a lithographic printing unit. Moreover, color intensity is stronger and more brilliant because the flexographic ink is applied at a much larger film thickness than can be applied by the lithographic process and is not diluted by dampening solution.

The inking/coating applicator head 60 includes side frame members 74, 76 that support the applicator roller 66, gear train 64, gear train 65, doctor blade

assembly 68 and the drive motor 62. The applicator roller 66 is supported at opposite ends on a lower cradle formed by a pair of end plates 78, 80 which hold the applicator roller 66 in parallel alignment with the blanket cylinder 34 (FIGURE 5). The side frames 74, 76 are also provided with an upper cradle formed by a pair of side plates 82, 84 which are vertically spaced with respect to the lower side plates 78, 80. Each cradle has a pair of sockets 79, 81 and 83, 85, respectively, for holding the applicator roller 66 for spot coating or inking engagement against the plate P of the plate cylinder 32 (FIGURE 4) or the blanket B of the blanket cylinder 34.

Preferably, the applicator roller 66 for the upper cradle (plate) position is an anilox roller having a resilient transfer surface. In the dual cradle arrangement, the press operator can quickly change over from blanket inking/coating and plate inking/coating with minimum press down time, since it is only necessary to remove and reposition or replace the applicator roller 66, and wash-up the doctor blade assembly if changing from ink to coating or vice versa. The capability to selectively operate in either the flexographic mode or the lithographic mode and to print or coat from either the plate or blanket position is referred to herein as the "LITHOFLEX" process.

Referring again to FIGURE 2 and FIGURE 3, the applicator head 60 is supported by the carriage assembly 58 in a cantilevered, pivotal arrangement which allows the dual cradle inking/coating apparatus 10 and a single cradle

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inking/coating apparatus 110 to be used between any two adjacent printing units, as well as used on the first and last printing units of the press. This is made possible by a pair of cantilevered support arms 88, 90 that are

5 pivotally coupled to the side plates 74, 76, respectively, on a pivot shaft 77. Each support arm has a hub portion 88A, 90A, respectively, and an elongated shank portion 88B, 90B, respectively.

10 The cantilevered support arms are pivotally mounted on the printing tower by pivot blocks 92, 94, respectively. The hub portions 88A, 90A are journaled for rotation on pivot shafts 96, 98, respectively. The pivot blocks 92, 94 are securely fastened to the tower 14D, so that the carriage assembly 86 is pivotally suspended from

15 the pivot shafts 96, 98 in a cantilevered Ferris support arrangement. The shank portions 88B, 90B are pivotally coupled to the pivot shaft 77, so that the carriage assembly 58 and the applicator head 60 are capable of independent rotation with respect to each other and with

20 respect to the pivot shaft 77. By this arrangement, the applicator head 60 is pivotally suspended from the pivot shaft 77, and remains in an upright orientation as the support arms rotate from the operative position to the fully retracted position, and vice versa.

25 Thus, the cradles 78, 80 and 82, 84 position the applicator roller 66 in vertical and horizontal alignment with the plate cylinder or blanket cylinder when the applicator head is extended to the operative position, for

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example as shown in FIGURE 4 and FIGURE 5. Moreover, because of the transverse relationship between the hub portion and shank portion of the support arms, the applicator head 60 and carriage assembly 58 are capable of rotating through a Ferris arc without touching the adjacent printing tower. This makes it possible to install the inking/coating apparatus 10 on any intermediate printing unit tower (T2, T3), and as well as on the first printing unit tower T1 and the last printing unit tower T4. Additionally, when the inking/coating unit 10 is in the operative position, the lateral projection of the applicator head 60 into the interstation space between printing units is minimized. This assures virtually unrestricted operator access to the interstation space between adjacent printing units when the applicator head is engaged in the operative position, and completely unrestricted access when the carriage assembly 58 is retracted.

Rotation of the carriage assembly 58 is counter-clockwise from the retracted, idle position (shown in phantom in FIGURE 1) to the operative position (FIGURE 4 and FIGURE 5). The carriage assembly 58 can be adapted for clockwise rotation from the retracted position to the operative position for engagement of the applicator roller to either the plate or the blanket on the dampener side of the tower, assuming that access to the plate and blanket is not restricted by dampener rollers or the like.

Rotational movement of the support arms 88, 90 is assisted by counterweights 100, 102 which are secured to

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the support arms, respectively, for concurrent rotation with respect to the pivot blocks 92, 94. With the passive assistance of the counterweights, the press operator can easily move the inking/coating assembly 10 from the engaged operative position as shown in FIGURE 4 to the fully retracted, idle position as shown in phantom in FIGURE 1. Preferably, rotation of the carriage assembly 58 is assisted by a torsion spring, electric motor or hydraulic motor.

10 The inking/coating apparatus 10 is releasably locked into the operative position as shown in FIGURE 4 by releasable latch couplings 103, 105 that secure the support arms 88, 90 to the press side frames 14, 15, respectively, of the printing unit tower T4 in the operative position. 15 Coating engagement of the applicator roller 66 against the blanket cylinder 34 is produced by power actuators, preferably pneumatic cylinders 104, 106 which have extendable/retractable power transfer arms 104A, 106A, respectively. The pneumatic cylinder 104 is pivotally 20 coupled to the support arm 88 by a pivot linkage 108, and the second pneumatic cylinder 106 is pivotally coupled to the support arm 90 by a pivot linkage 109. In response to actuation of the pneumatic cylinders 104, 106, the power transfer arms are retracted. As the transfer arms retract, 25 the inking/coating head 60 is rotated counterclockwise on the pivot shaft 77, thus moving the applicator roller 66 into coating engagement with the blanket cylinder 34.

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The pivot linkage 108 includes a bell crank 111 which is mounted for pivotal movement on a pin 113. The pin 113 is supported by a clevis plate 115 which is attached to the support arm 88. One end of the bell crank is pivotally coupled to the actuator arm 104A, and a cam roller 117 is mounted for rotation on its opposite end.

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10 The cam roller 117 is engagable against an adjustable stop 119 which is rigidly secured to the side plate 74. Counterclockwise shifting of the handle H moves a cam follower 121 into a latch pocket 123 of a receiver block 125 as the cam roller 117 is moved into engagement with the adjustable stop 119 in the interlocked, operative position. Referring to FIGURE 4, FIGURE 5 and FIGURE 6, the receiver block 125 is secured to the delivery side of the printing unit tower by machine screws.

20 When the plate P goes on impression, power is applied to the pneumatic actuator 104 and the power transfer arm 104A retracts, thus causing the bell crank 111 to rotate counterclockwise about the pin 113. The torque applied by the pneumatic actuator 104 is transmitted to the applicator head 60 through the cam roller 117 and the adjustable stop 119. Counterclockwise movement of the applicator head 60 relative to the support shaft 77 carries the applicator roller 66 into engagement with the plate P.

25 The adjustable stop 119 has a threaded bolt 119A which is engagable with the cam roller 117. The striking point of engagement is preset so that the applicator roller 66 is properly positioned for engagement with the plate P

or blanket B in the operative position when the applicator head 60 is interlocked with the press frame 14 and the printing unit goes on impression.

Referring to FIGURE 5, an inking/coating apparatus 110 having a single head is illustrated. The construction of this alternative embodiment is identical in all respects with the dual head arrangement, with the exception that only a single gear train and a single cradle for holding the applicator roller is provided. In both embodiments, the inking/coating head 60 remains upright as it swings through an arc, comparable to the movement of a Ferris wheel. Because of the upright orientation of the inking/coating head 60 as it moves between the extended and retracted positions, the usual platform spacing between printing unit towers provides adequate clearance to permit extension and retraction of the carriage assembly 58 without interference with operator access to the printing units. This is a significant advantage in that it permits the in-line inking/coating apparatus 10 to operate effectively in the interstation space between any adjacent printing units, and without blocking or obstructing access to the cylinders of the printing units when the inking/coating apparatus is in the retracted position (as indicated in phantom in FIGURE 1).

Moreover, when the in-line inking/coating apparatus is in the fully retracted position, the applicator roller 66 is conveniently positioned on the dampener side of the printing unit for inspection, clean-up or

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replacement. Additionally, the doctor blade assembly is also conveniently positioned for inspection, removal, adjustment or clean-up. Also, the doctor blade reservoir and coating circulation lines can be cleaned while the press is running as well as when the press has been stopped for change-over from one type of ink or coating material to another.

When the inking/coating apparatus is used for applying an aqueous ink or an aqueous coating material, the water component on the freshly printed sheet S is evaporated by a high velocity, hot air interstation dryer and high volume heat and moisture extractor units 112 and 114, as shown in FIGURE 1, FIGURE 4 and FIGURE 5. The dryer/extractor units 112 and 114 are oriented to direct high velocity heated air onto the freshly printed/coated sheets as they are transferred by the interunit and the intermediate transfer cylinders 36, 40. By this arrangement, the freshly printed aqueous ink or coating material is completely dry before the sheet is overprinted in the next printing unit.

The high velocity, hot air dryer and high performance heat and moisture extractor units 112, 114 utilize high velocity air jets which scrub and break-up the moist air level which clings to the surface of each freshly printed sheet. Within each dryer, high velocity air is heated to a high temperature as it flows across a resistance heating element within an air delivery baffle tube. High velocity jets of hot air are discharged through

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multiple airflow apertures through an exposure zone Z (FIGURE 4 and FIGURE 5) onto the freshly printed/coated sheet S as it is transferred by the transfer cylinder 36 and intermediate transfer cylinder 40, respectively. Each
5 dryer assembly includes a pair of air delivery dryer heads which are arranged in spaced, side-by-side relation as shown in FIGURE 4 and FIGURE 5.

The high velocity, hot moisture-laden air displaced from each freshly printed sheet is extracted from
10 the dryer exposure zone Z and completely exhausted from the printing unit by the high volume extractors. Each extractor head includes a manifold coupled to the dryer heads and draws the moisture, volatiles and high velocity hot air through a longitudinal gap between the dryer heads.
15 According to this arrangement, each printed sheet is dried before it is run through the next printing unit.

The water-based inks used in flexographic printing dry at a relatively moderate drying temperature provided by the interstation high velocity hot air dry-
20 ers/extractors 112, 114. Consequently, print quality is substantially improved since the aqueous ink is dried at each printing unit before it enters the next printing unit. Moreover, back-trapping on the blanket of the next printing unit is completely eliminated. This interstation drying
25 arrangement makes it possible to print aqueous inks such as metallic ink and opaque white ink at one printing unit, and then overprint at the next printing unit.

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5 This arrangement also permits the first printing unit to be used as a coater in which an aqueous coating is applied to low grade paper, for example recycled paper, to trap and seal in lint, dust, spray powder and other debris and provide a smoother, durable surface that can be overprinted in the next printing unit. The first down coating seals the surface of the low grade, rough substrate and improves overprinted dot definition while preventing strike-through and show-through. A UV-curable protective and/or decorative coating can be applied over the first down overprinted (aqueous) coating in the last printing unit.

15 Preferably, the applicator roller 66 is constructed of metal or ceramic when it is used for applying a coating material to the blanket B on the cylinder 34. When the applicator roller 66 is applied to the plate, it is preferably constructed as an anilox roller having a resilient transfer surface for engaging a flexographic printing plate. Suitable resilient roller surface materials include Buna N synthetic rubber and EPDM (terpolymer elastomer).

25 It will be appreciated that the inking/coating apparatus 10 is capable of applying a wide range of ink types, including fluorescent (Day Glo), pearlescent, metallics (gold, silver and other metallics), glitter, scratch and sniff (micro-encapsulated fragrance), scratch and reveal, luminous, pressure-sensitive adhesives and the like.

The press operator can eliminate the dampener roller assembly altogether, and the inking/coating apparatus 10 can selectively apply aqueous inks and coatings to a flexographic or waterless printing plate and the blanket.

5 Moreover, overprinting of the aqueous inks and coatings can be carried out in the next printing unit since the aqueous inks and coatings are completely dried by the high velocity, hot air interstation dryer and high volume heat and moisture extractor assembly.

10 The aqueous inks and coatings as used in the present invention contain colored pigments and/or soluble dyes, binders that fix the pigments onto the surface of the printed sheet, and waxes, defoamers and thickeners. Aqueous printing inks predominantly contain water as a

15 solvent, diluent and/or vehicle. The thickeners which are preferred include algonates, starch, cellulose and its derivatives, for example cellulose esters or cellulose ethers and the like. Coloring agents including organic as well as inorganic pigments may be derived from dyes which

20 are insoluble in water. Also, the printing ink may contain water and can be predominantly glycol or the like, with the pigment being bound by an appropriate resin. When metallic inks are printed, the cells of the anilox roller must be appropriately sized to prevent the metal particles from

25 getting stuck within the cells. The cell size is critical, and for metallic gold ink, the anilox roller should have a screen line count in the range of 175-300 lines per inch (69-118 lines per cm).

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The inking/coating apparatus 10 can also apply UV-curable inks and coatings. If UV-curable inks and coatings are utilized, ultra-violet dryers/extractors are installed adjacent the high velocity hot air dryer/extractor units 112, 114, respectively.

It will be appreciated that the inking/coating apparatus 10 described herein makes it possible to selectively operate a printing unit in either the flexographic printing mode or the lithographic printing mode, while also providing the capability to print or coat from either the plate or blanket position. The dual cradle support arrangement of the present invention makes it possible to quickly change over from inking/coating at the blanket cylinder position to inking/coating at the plate cylinder position with minimum press down-time, since it is only necessary to remove and reposition or replace the applicator roller 66 while the printing/inking apparatus is in the retracted position.

Moreover, the press operator may elect to spot or overall coat with aqueous ink/coating from the plate during one job, and then spot and/or overall coat from the blanket during the next job. Since the doctor blade assembly can be flushed and washed-up quickly and the applicator roller can be replaced quickly, it is possible to spot coat or overall coat from the plate position or the blanket position with aqueous inks or coatings during the first press run and then spot coat or overall coat with UV-curable inks or coatings from the plate position or from

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the blanket position during the next press run. The inking/coating apparatus 10 is completely out of the way in the retracted position; consequently, the doctor blade reservoir and supply lines can be flushed and washed-up by automatic wash-up equipment while the printing unit is printing another job.

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10 The positioning of the applicator head and roller assembly relative to the plate and blanket is repeatable to a predetermined, preset impression position. Consequently, no printing unit adjustment or alteration is required, except for flushing the doctor blade assembly and cleaning or replacing the applicator roller to accommodate a different kind of ink or coating material. Although manual extension and retraction have been described in connection with the exemplary embodiment, extension to the operative position and retraction to a non-operative idle position can be carried out automatically by hydraulic or electric motor servomechanisms.

20 The Ferris wheel support arrangement allows the inking/coating apparatus to operate effectively in the interstation space between any adjacent printing units, as well as on the first or last printing units of the press, without blocking or obstructing the interstation space or restricting operator access to the cylinders of any of the printing units.

25 Finally, because the inking/coating apparatus of the present invention is mounted on a printing unit tower and is extendable to the operative position without

requiring adjustment or alteration of the printing unit cylinders, it can be used for applying printing ink or coating material to the blanket cylinder of a rotary offset web press, or to the blanket of a dedicated coating unit.

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requiring adjustment or alteration of the printing unit cylinders, it can be used for applying printing ink or coating material to the blanket cylinder of a rotary offset web press, or to the blanket of a dedicated coating unit.

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THE EMBODIMENT OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. Inking/coating apparatus for use in a printing press of the type having a printing unit on which a plate cylinder, a blanket cylinder and an impression cylinder are mounted for rotation, wherein the inking/coat-

5 ing apparatus is characterized by:

an applicator head for applying ink or coating material to a plate mounted on the plate cylinder or to a blanket mounted on the blanket cylinder, either separately or simultaneously when the inking/coating
10 apparatus is in an operative position relative to the plate and blanket cylinders; and,

a carriage assembly for moving the applicator head to the operative position in which the applicator head is disposed laterally adjacent to the plate and
15 blanket cylinders and for moving the applicator head from the operative position to a retracted position in which the applicator head is elevated with respect to the plate and blanket cylinders.

2. Inking/coating apparatus as set forth in
20 claim 1, wherein the carriage assembly is characterized by:

a support arm having a first end portion constructed for pivotal attachment to the printing unit and having a second end portion pivotally coupled to the

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applicator head, the applicator head being movable on the support arm to the operative position.

3. Inking/coating apparatus as set forth in claim 1, characterized in that a counterweight is coupled
5 to the carriage assembly.

4. Inking/coating apparatus as set forth in claim 1, wherein the applicator head is characterized by:
a doctor blade assembly having a reservoir
10 for receiving ink or liquid coating material; and,
an applicator roller coupled to the doctor blade assembly in fluid communication with the reservoir, the applicator roller being engagable with a printing plate on the plate cylinder or with a blanket on the blanket
15 cylinder when the applicator head is in the operative position.

5. Inking/coating apparatus as set forth in claim 4, characterized in that the applicator roller is an
20 anilox roller having a resilient transfer surface.

6. Inking/coating apparatus as set forth in claim 1, characterized in that:
a power actuator is movably coupled to the
25 applicator head, the power actuator having a power transfer arm which is extendable and retractable; and,

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movement converting apparatus is coupled to the power transfer arm for converting extension or retraction movement of the power transfer arm into pivotal movement of the applicator head relative to the carriage assembly.

7. Inking/coating apparatus as set forth in claim 6, wherein the movement converting apparatus is characterized by:

10 a bell crank plate having a first end portion coupled to the power transfer arm and having a second end portion for engaging a stop member;

a stop member secured to the applicator head; and,

15 a clevis plate secured to the carriage assembly and pivotally coupled to the bell crank plate.

8. Inking/coating apparatus as set forth in claim 1, wherein the applicator head is characterized by:

first and second side frame members pivotally coupled to the carriage assembly;

20 a doctor blade assembly mounted on the first and second side frame members, the doctor blade assembly including a reservoir for receiving ink or liquid coating material;

a cradle assembly mounted on the first and
25 second side frame members, respectively;

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an applicator roller mounted for rotation on the cradle assembly and coupled to the doctor blade assembly for rolling contact with ink or coating material in the reservoir, the applicator roller being engagable
5 with a printing plate on the plate cylinder or with a blanket on the blanket cylinder when the applicator head is in the operative position; and,

a drive motor coupled to the applicator roller for rotating the applicator roller.

10 9. Inking/coating apparatus as set forth in claim 8, characterized in that:

the cradle assembly has first and second sockets disposed on the first and second side frame members respectively; and,

15 the applicator roller is mounted for rotation on the first and second sockets.

10. Inking/coating apparatus as set forth in claim 8, characterized in that

20 the cradle assembly includes first and second sockets disposed on the first and second side frame members, respectively, and third and fourth sockets disposed on the first and second side frame members, respectively; and,

25 the applicator roller is selectively mountable for rotation on either the first and second sockets or on the third and fourth sockets for applying ink

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or coating material to either the plate or blanket when the applicator head is in the operative position.

11. Inking/coating apparatus as set forth in claim 1, wherein the applicator head is characterized by:

5 a first cradle for supporting an applicator roller for engagement with the plate when the inking/coating apparatus is in the operative position; and

10 a second cradle for supporting an applicator roller for engagement with the blanket when the inking/coating apparatus is in the operative position.

12. Inking/coating apparatus as set forth in claim 1, wherein the carriage assembly is characterized by:

15 a support arm having a first end portion pivotally coupled to the printing unit and having a second end portion;

a common pivot shaft on which the support arm second end portion and the inking/coating apparatus are pivotally mounted; and,

20 male and female latch members coupled between the common pivot shaft and the printing unit, with one of the latch members being secured to the common pivot shaft and the other latch member being constructed for attachment onto the printing unit, the latch members being mateable in interlocking engagement when the applicator
25 head is in the operative position.

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13. Inking/coating apparatus as set forth in claim 1, wherein the applicator head and the printing unit are characterized by:

male and female latch coupling members
5 mounted on the carriage assembly and on the printing unit for releasably latching the carriage assembly in interlocking engagement with the printing unit when the applicator head is in the operative position.

10 14. Inking/coating apparatus as set forth in claim 1, wherein the carriage assembly is characterized by an elongated shank portion and a hub portion, the elongated shank portion being pivotally coupled to the applicator head and the hub portion being constructed for pivotal attachment onto the printing unit.

15 15. A rotary offset printing press having first and second printing units and the inking/coating apparatus of claim 1 is movably coupled to the first printing unit as set forth in claim 1, characterized by:

20 a dryer mounted on the first printing unit adjacent the impression cylinder of the first printing unit for discharging heated air onto a freshly printed substrate while the freshly printed substrate is in contact with said impression cylinder.

25 16. A rotary offset printing press as defined in claim 15, characterized in that:

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an extractor is disposed adjacent the dryer for extracting hot air, moisture and volatiles from an exposure zone between the dryer and the freshly printed substrate.

5 17. A rotary offset printing press as defined in claim 15, characterized in that:

an intermediate transfer cylinder is coupled in sheet transfer relation with the impression cylinder of the first printing unit; and,

10 an interstation dryer is disposed adjacent the intermediate transfer cylinder for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the impression cylinder of the first printing unit and while it is in contact with the inter-
15 mediate transfer cylinder.

18. A method for rotary offset printing in a printing press of the type including first and second rotary offset printing units, and using aqueous or UV-curable printing ink or coating material in the operation
20 of at least the first printing unit, characterized by the following steps performed at each printing unit in succession:

spot or overall coating the plate with
aqueous ink/aqueous coating material or UV-curable ink/UV-
25 curable coating material;

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spot and/or overall coating the blanket with aqueous ink/aqueous coating material or UV-curable ink or UV-curable coating material;

transferring the printing ink or coating material from the printing plate to the blanket;

transferring the inked or coated image from the blanket to a substrate as the substrate is transferred through the nip between the impression cylinder and the blanket; and,

drying the ink or coating material on the freshly printed substrate before the substrate is subsequently processed.

19. A method for rotary offset printing as defined in claim 18, wherein the drying step is characterized by:

discharging high velocity, heated air onto the freshly printed/coated substrate while the freshly printed/coated substrate is in contact with the impression cylinder of the first printing unit.

20. A method for rotary offset printing as defined in claim 18, characterized by the steps:

transferring the freshly printed substrate from the first printing unit to an intermediate transfer cylinder; and,

drying the freshly printed substrate while it is in contact with the intermediate transfer cylinder.

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21. A method for rotary offset printing as defined in claim 18, characterized by the step:

extracting hot air, moisture and volatiles from an exposure zone above the freshly printed/coated substrate while the freshly printed/coated substrate is in contact with the impression cylinder.

22. A method for rotary offset printing as defined in claim 18, characterized by the steps:

applying a primer coating of an aqueous coating material or UV-curable coating material to a substrate in the first printing unit; and,

drying the primer coating on the substrate before the substrate is processed in the second printing unit.

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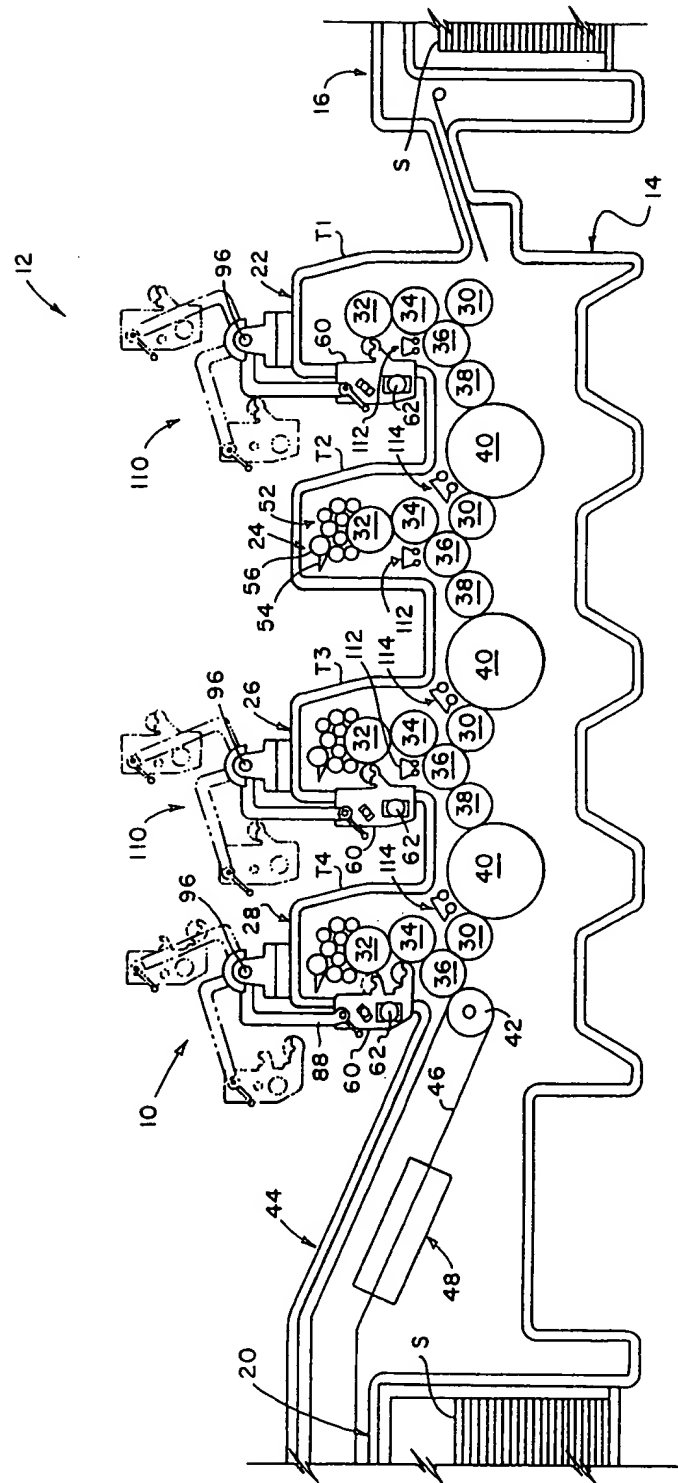


FIG. 1

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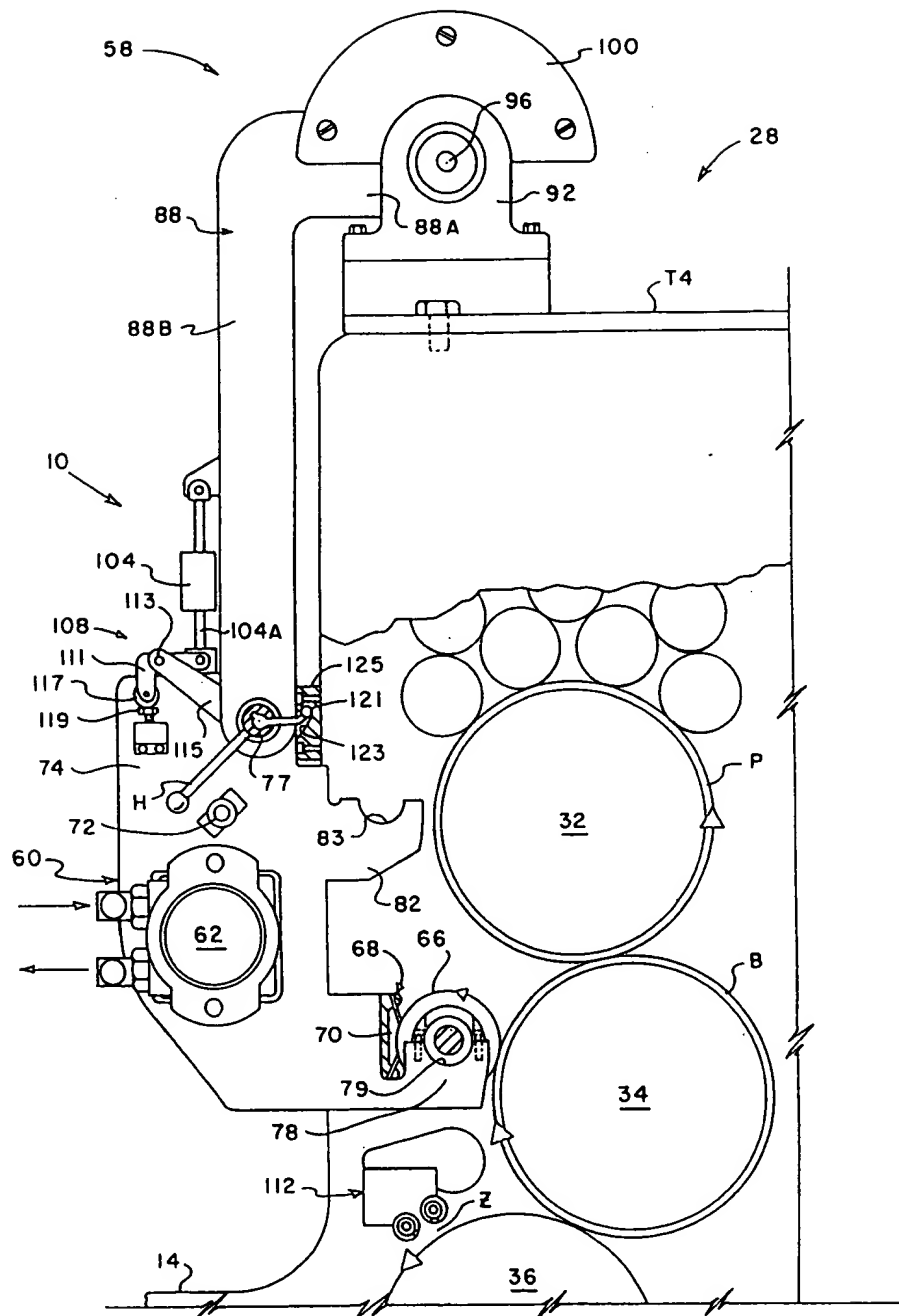
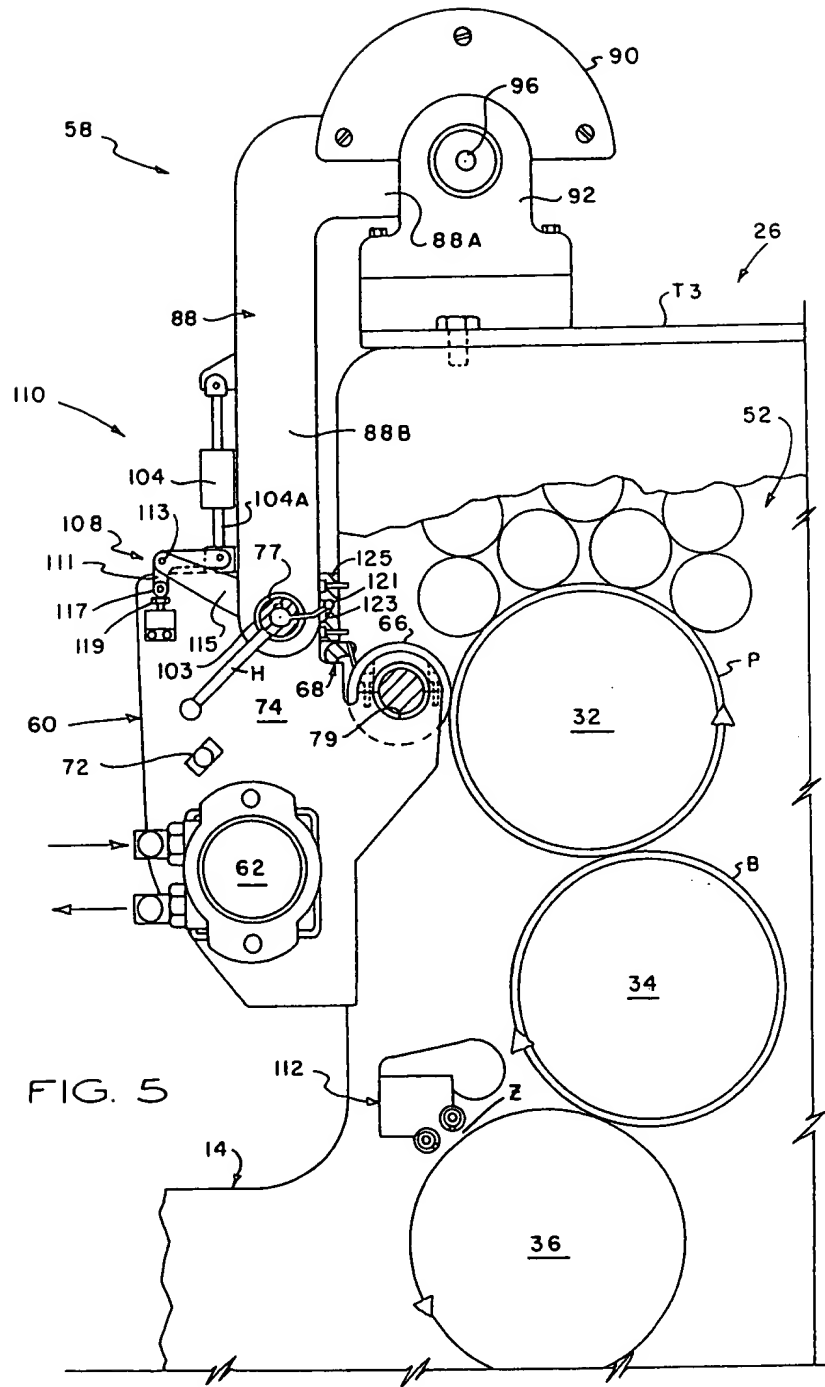


FIG. 4

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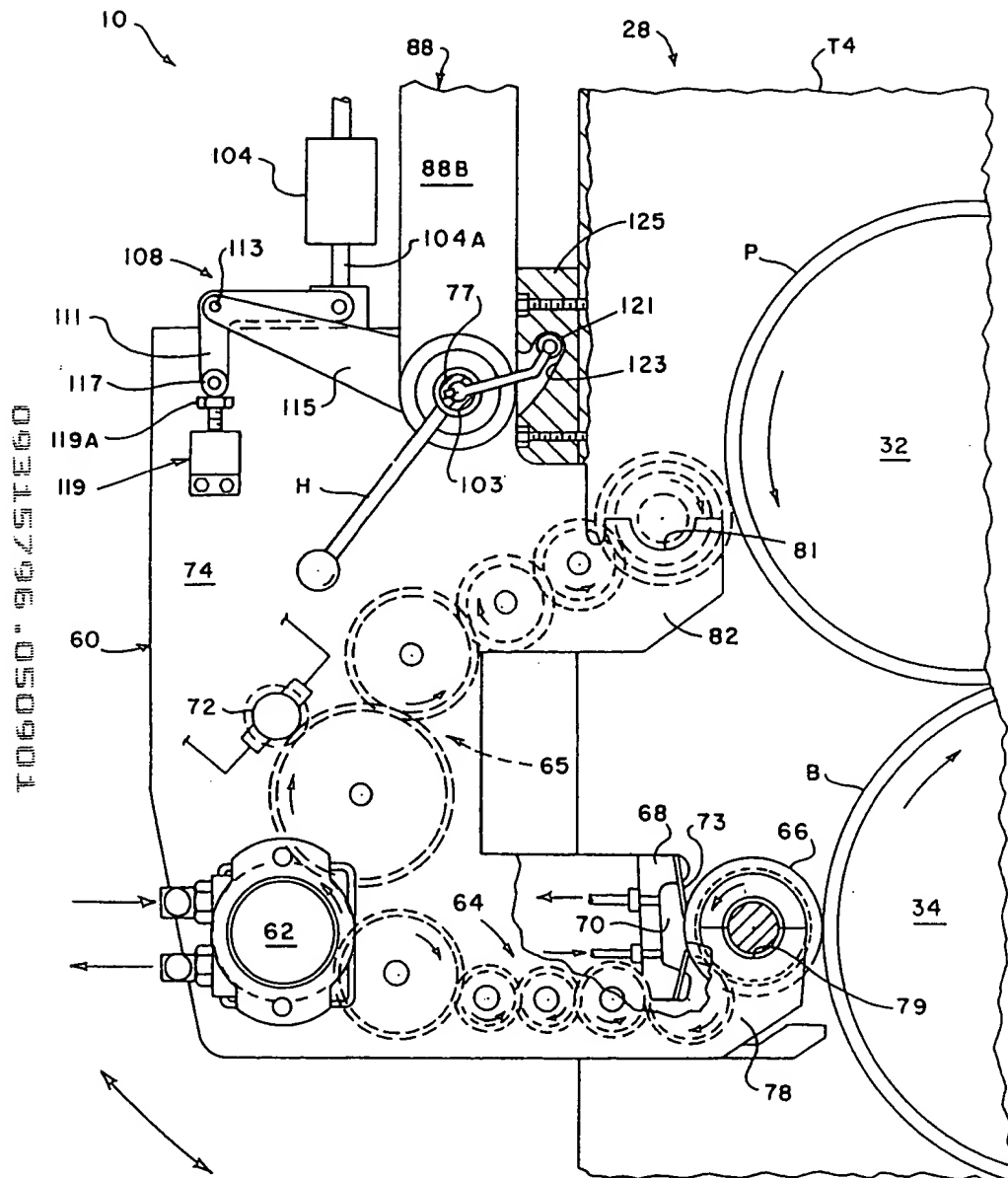


FIG. 6

Ogilvie

AND COMPANY
BARRISTERS AND SOLICITORS
PATENT AND TRADE MARK AGENTS

OUR FILE: 7006.021

YOUR FILE:

REPLY TO:

E. PETER JOHNSON
EDMONTON OFFICE

DIRECT LINE: 429-6291

Internet email:
pjohnson@compuserve.ab.ca

1400 METROPOLITAN PLACE
10303 JASPER AVENUE
EDMONTON, ALBERTA
T5J 3N6
FACSIMILE (403) 429-4453
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1600 CANADA PLACE
407 - 2ND STREET SW
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OGILVIE, J. H. QC (1893-1977)

June 19, 1996

Commissioner of Patents
1 Place du Portage
OTTAWA/HULL, Canada
K1A 0C9

ATTENTION: Patent Formalities Clerk

Dear Sirs:

Re: Canadian Patent Application 2,175,731
Applicant - H. W. DeMoore
Title - RETRACTABLE INKING/COATING APPARATUS HAVING FERRIS
MOVEMENT BETWEEN PRINTING UNITS

This is responsive to your letter dated May 17, 1996, received in the abovenamed case.

Enclosed is an assignment (in duplicate) from R. M. Rendleman and J. W. Bird to H. W. DeMoore for filing in the abovenamed application. A cheque in the amount of \$300.00 is enclosed to cover the completion fee and the fee for registering the assignment.

We look forward to receiving the registration details in due course.

Yours truly,

OGILVIE AND COMPANY

Per: *E. Peter Johnson*

E. PETER JOHNSON
EPJ/DLM
Enclosures

Industry Canada	Industry Canada
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Dossier File	
Remise à Chargé de	

Titre H2396	Numéro 409	Date de versement Trans Date JUL 20 1996	TPS GST
72475		Clientèle (Fournisseur)	
IR RC	Charges Account 51000 51611 29401	Montant à verser Total Amount 200.00 100.00 300.00	Autre montant Other Amount
Initial		Approuvé par Approved by	

Ogivie and Company
1400 Metropolitan Place
10303 Jasper Avenue
Edmonton, Alberta
T5J 3N6

Date May 17, 1996	No.-No. 2,175,731
Applicant-Requérant HOWARD W. DeMOORE	
Your Reference-Votre Référence 7006.021	

Dear Sir/Madam:

Your application for Patent has been allotted the above mentioned serial number and the filing date of May 3, 1996.

However, this application is incomplete with regard to the following items:

- 1) Assignment
- 2) Completion fee as prescribed in Schedule II of the Patent Rules.

Your attention is directed to Section 30 of the Patent Act.

Yours truly,

Pepe Ali
Patent Formalities Clerk
(819) 953-8985
ym\m15



Ottawa Hull K1A 0C9

Ogilvie & Company
1400 Metropolitan Place
10303 Jasper Avenue
Edmonton, Alberta
T5J 3N6

Your File
7006.021

FILING CERTIFICATE

Patent File No: 2,175,731 Filed: 1996/05/03
Laid-Open Date: 1996/11/05
Priority Date : U.S.A. (08/435,798) 19950504
Invention : Retractable Inking/Coating Apparatus
Having Ferris Movement Between Printing
Units
Owner(s) : DeMoore, Howard W.
Inventor(s) : DeMoore, Howard W.; Rendleman, Ronald
M.; Bird, John W.

Request for examination has been initiated

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T06050-96/STEG0

SPECIAL NOTICE

You are reminded that annual fees to maintain your application (or patent) are needed for each one-year period between the 1st and 19th anniversaries of the filing date. Failure to pay will lead to abandonment of your application (or lapsing of a patent).

A. McLaughlin

DIRECTOR
PATENT BRANCH



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Canada

OUR FILE: 7006.021

YOUR FILE:

REPLY TO:

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106050-9000

May 2, 1996

Commissioner of Patents
1 Place du Portage
OTTAWA/HULL, Canada
K1A 0C9

Dear Sir:

Transmitted herewith for filing is the patent application of:

Applicant - Howard W. DeMoore

Inventors - Howard W. DeMoore, Ronald M. Rendleman and John W. Bird

Title - RETRACTABLE INKING/COATING APPARATUS HAVING FERRIS MOVEMENT
BETWEEN PRINTING UNITS

Also enclosed is:

- a Petition - Claiming Priority of corresponding U.S. application and small entity status; and
- 5 sheets of formal drawings (in duplicate).

Claims as filed:

Basic Fee - \$150.00

Total claims - 22

Fee - ---

Independent claims - 2

Fee - ---

Total Filing fee - \$150.00

Applicant respectfully requests examination of the application under subsection 35(1) of the Act.

Also enclosed is a cheque in the amount of \$350.00 to cover the filing fee and the fee for requesting examination.

Yours truly,

OGILVIE AND COMPANY

Per:

E. PETER JOHNSON
EPJ/DLM
Enclosures

OGILVIE, J.H. QC (1893-1977)

Industrie Canada	Industry Canada
OPIC	CIPO
18	MAY 3 1996 18
Dossier File	
Remis à Chargé to	

Reference	478	25-76	178	179
Deposited	071812			
CR HC	Compte	Montant en	Montant en	Montant en
	Account	Can. Amount	Other Currency	Other Currency
Visa	51000	29101	1501	
Montant en		29201	2001	
Can. Amount				
Other Currency				
Other Currency				
Other Currency				

EXHIBIT 40

THE EMBODIMENT OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. Inking/coating apparatus for use in a printing press of the type having a printing unit on which a plate cylinder, a blanket cylinder and an impression cylinder are mounted for rotation, wherein the inking/coat-

5 ing apparatus is characterized by:

an applicator head for applying ink or coating material to a plate mounted on the plate cylinder or to a blanket mounted on the blanket cylinder, either separately or simultaneously when the inking/coating
10 apparatus is in an operative position relative to the plate and blanket cylinders; and,

a carriage assembly for moving the applicator head to the operative position in which the applicator head is disposed laterally adjacent to the plate and
15 blanket cylinders and for moving the applicator head from the operative position to a retracted position in which the applicator head is elevated with respect to the plate and blanket cylinders.

2. Inking/coating apparatus as set forth in
20 claim 1, wherein the carriage assembly is characterized by:

a support arm having a first end portion constructed for pivotal attachment to the printing unit and having a second end portion pivotally coupled to the

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applicator head, the applicator head being movable on the support arm to the operative position.

3. Inking/coating apparatus as set forth in claim 1, characterized in that a counterweight is coupled
5 to the carriage assembly.

4. Inking/coating apparatus as set forth in claim 1, wherein the applicator head is characterized by:
a doctor blade assembly having a reservoir
10 for receiving ink or liquid coating material; and,
an applicator roller coupled to the doctor blade assembly in fluid communication with the reservoir, the applicator roller being engagable with a printing plate on the plate cylinder or with a blanket on the blanket
15 cylinder when the applicator head is in the operative position.

5. Inking/coating apparatus as set forth in claim 4, characterized in that the applicator roller is an
20 anilox roller having a resilient transfer surface.

6. Inking/coating apparatus as set forth in claim 1, characterized in that:
a power actuator is movably coupled to the
25 applicator head, the power actuator having a power transfer arm which is extendable and retractable; and,

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movement converting apparatus is coupled to the power transfer arm for converting extension or retraction movement of the power transfer arm into pivotal movement of the applicator head relative to the carriage assembly.

7. Inking/coating apparatus as set forth in claim 6, wherein the movement converting apparatus is characterized by:

a bell crank plate having a first end portion coupled to the power transfer arm and having a second end portion for engaging a stop member;

a stop member secured to the applicator head; and,

a clevis plate secured to the carriage assembly and pivotally coupled to the bell crank plate.

8. Inking/coating apparatus as set forth in claim 1, wherein the applicator head is characterized by:

first and second side frame members pivotally coupled to the carriage assembly;

a doctor blade assembly mounted on the first and second side frame members, the doctor blade assembly including a reservoir for receiving ink or liquid coating material;

a cradle assembly mounted on the first and second side frame members, respectively;

an applicator roller mounted for rotation on the cradle assembly and coupled to the doctor blade assembly for rolling contact with ink or coating material in the reservoir, the applicator roller being engagable
5 with a printing plate on the plate cylinder or with a blanket on the blanket cylinder when the applicator head is in the operative position; and,

a drive motor coupled to the applicator roller for rotating the applicator roller.

9. Inking/coating apparatus as set forth in claim 8, characterized in that:

the cradle assembly has first and second sockets disposed on the first and second side frame members respectively; and,

15 the applicator roller is mounted for rotation on the first and second sockets.

10. Inking/coating apparatus as set forth in claim 8, characterized in that

the cradle assembly includes first and
20 second sockets disposed on the first and second side frame members, respectively, and third and fourth sockets disposed on the first and second side frame members, respectively; and,

the applicator roller is selectively
25 mountable for rotation on either the first and second sockets or on the third and fourth sockets for applying ink

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or coating material to either the plate or blanket when the applicator head is in the operative position.

11. Inking/coating apparatus as set forth in claim 1, wherein the applicator head is characterized by:

5 a first cradle for supporting an applicator roller for engagement with the plate when the inking/coating apparatus is in the operative position; and

10 a second cradle for supporting an applicator roller for engagement with the blanket when the inking/coating apparatus is in the operative position.

12. Inking/coating apparatus as set forth in claim 1, wherein the carriage assembly is characterized by:

15 a support arm having a first end portion pivotally coupled to the printing unit and having a second end portion;

a common pivot shaft on which the support arm second end portion and the inking/coating apparatus are pivotally mounted; and,

20 male and female latch members coupled between the common pivot shaft and the printing unit, with one of the latch members being secured to the common pivot shaft and the other latch member being constructed for attachment onto the printing unit, the latch members being mateable in interlocking engagement when the applicator
25 head is in the operative position.

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13. Inking/coating apparatus as set forth in claim 1, wherein the applicator head and the printing unit are characterized by:

5 male and female latch coupling members mounted on the carriage assembly and on the printing unit for releasably latching the carriage assembly in interlocking engagement with the printing unit when the applicator head is in the operative position.

10 14. Inking/coating apparatus as set forth in claim 1, wherein the carriage assembly is characterized by an elongated shank portion and a hub portion, the elongated shank portion being pivotally coupled to the applicator head and the hub portion being constructed for pivotal attachment onto the printing unit.

15 15. A rotary offset printing press having first and second printing units and the inking/coating apparatus of claim 1 is movably coupled to the first printing unit as set forth in claim 1, characterized by:

20 a dryer mounted on the first printing unit adjacent the impression cylinder of the first printing unit for discharging heated air onto a freshly printed substrate while the freshly printed substrate is in contact with said impression cylinder.

25 16. A rotary offset printing press as defined in claim 15, characterized in that:

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an extractor is disposed adjacent the dryer for extracting hot air, moisture and volatiles from an exposure zone between the dryer and the freshly printed substrate.

5 17. A rotary offset printing press as defined in claim 15, characterized in that:

an intermediate transfer cylinder is coupled in sheet transfer relation with the impression cylinder of the first printing unit; and,

10 an interstation dryer is disposed adjacent the intermediate transfer cylinder for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the impression cylinder of the first printing unit and while it is in contact with the inter-
15 mediate transfer cylinder.

18. A method for rotary offset printing in a printing press of the type including first and second rotary offset printing units, and using aqueous or UV-curable printing ink or coating material in the operation
20 of at least the first printing unit, characterized by the following steps performed at each printing unit in succession:

spot or overall coating the plate with aqueous ink/aqueous coating material or UV-curable ink/UV-
25 curable coating material;

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spot and/or overall coating the blanket with aqueous ink/aqueous coating material or UV-curable ink or UV-curable coating material;

transferring the printing ink or coating material from the printing plate to the blanket;

transferring the inked or coated image from the blanket to a substrate as the substrate is transferred through the nip between the impression cylinder and the blanket; and,

drying the ink or coating material on the freshly printed substrate before the substrate is subsequently processed.

19. A method for rotary offset printing as defined in claim 18, wherein the drying step is characterized by:

discharging high velocity, heated air onto the freshly printed/coated substrate while the freshly printed/coated substrate is in contact with the impression cylinder of the first printing unit.

20. A method for rotary offset printing as defined in claim 18, characterized by the steps:

transferring the freshly printed substrate from the first printing unit to an intermediate transfer cylinder; and,

drying the freshly printed substrate while it is in contact with the intermediate transfer cylinder.

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21. A method for rotary offset printing as defined in claim 18, characterized by the step:

extracting hot air, moisture and volatiles from an exposure zone above the freshly printed/coated substrate while the freshly printed/coated substrate is in contact with the impression cylinder.

22. A method for rotary offset printing as defined in claim 18, characterized by the steps:

applying a primer coating of an aqueous coating material or UV-curable coating material to a substrate in the first printing unit; and,

drying the primer coating on the substrate before the substrate is processed in the second printing unit.

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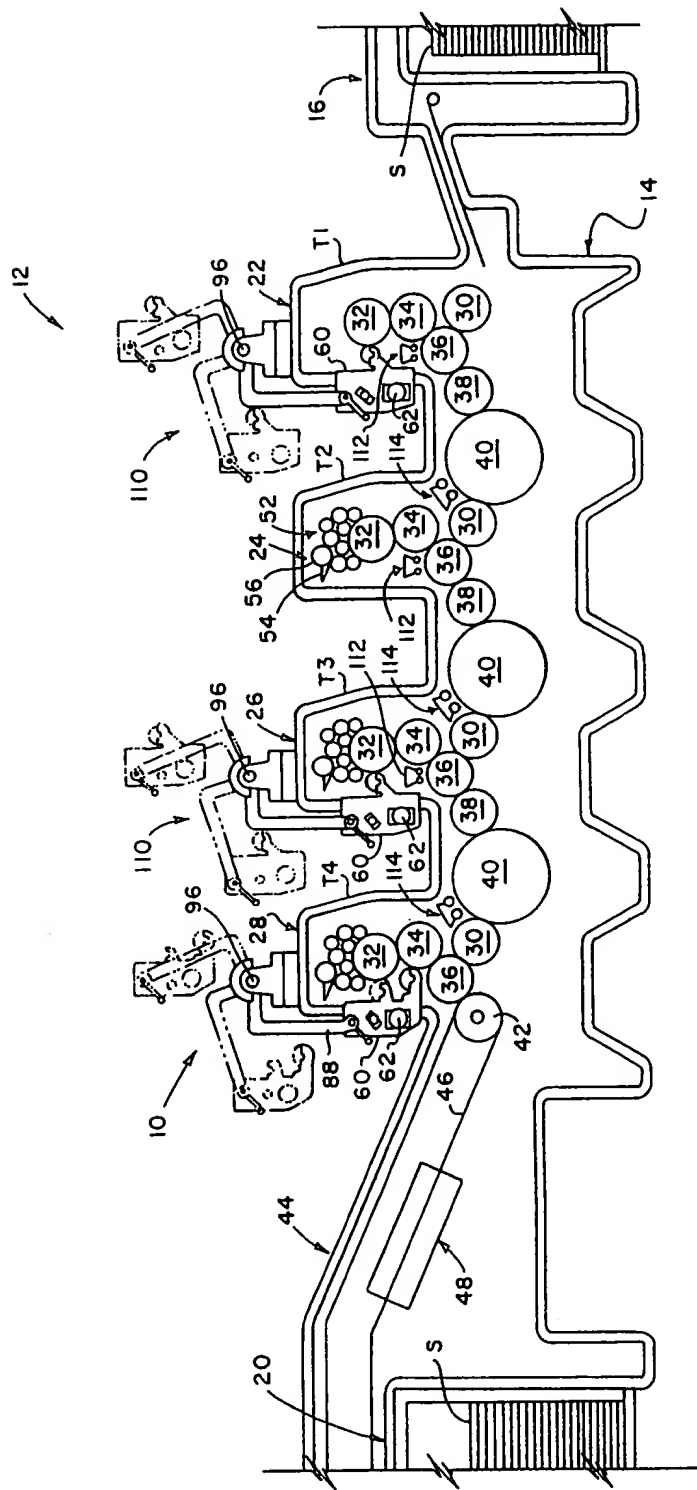


FIG. 1

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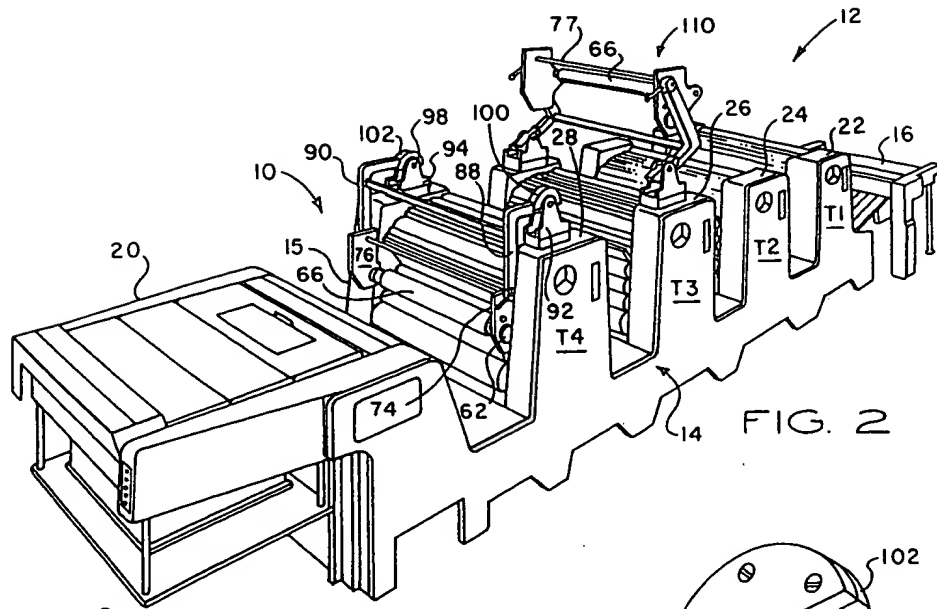


FIG. 2

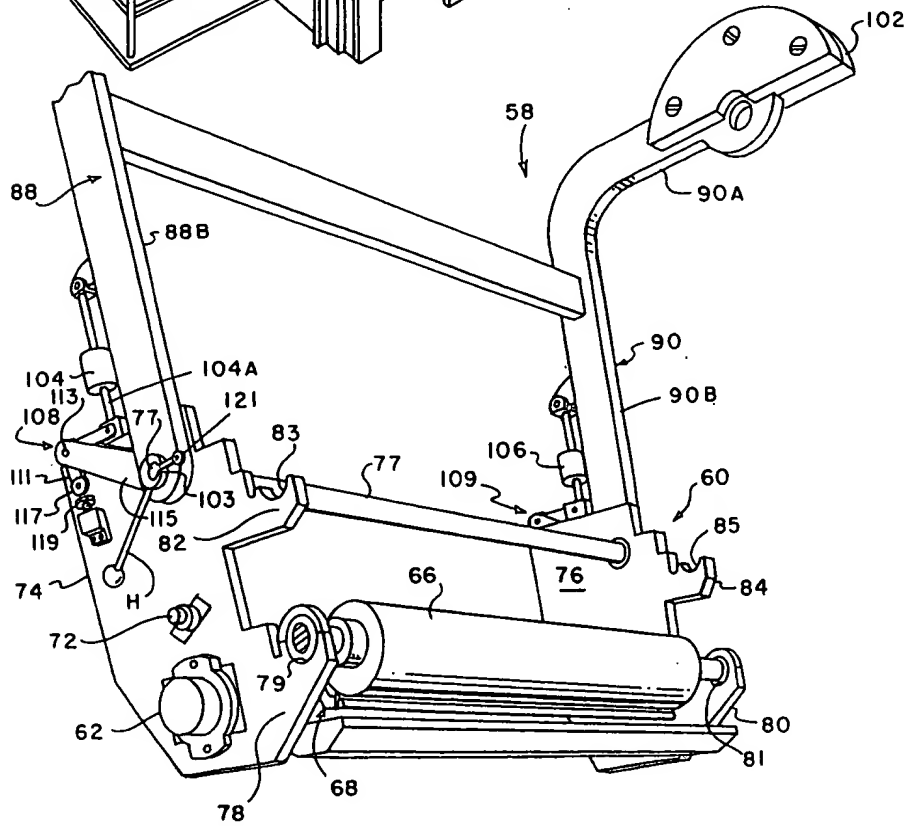


FIG. 3

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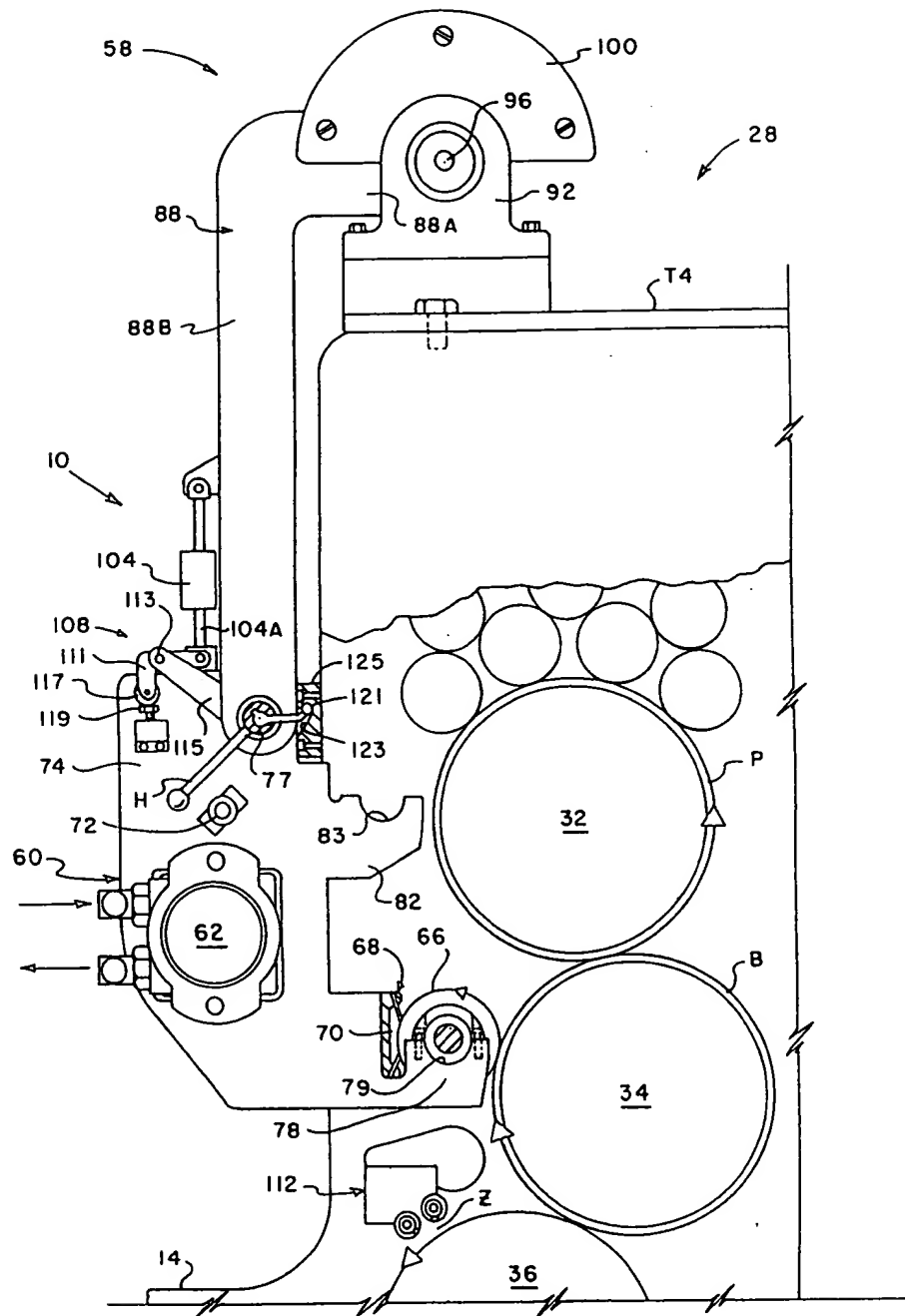


FIG. 4

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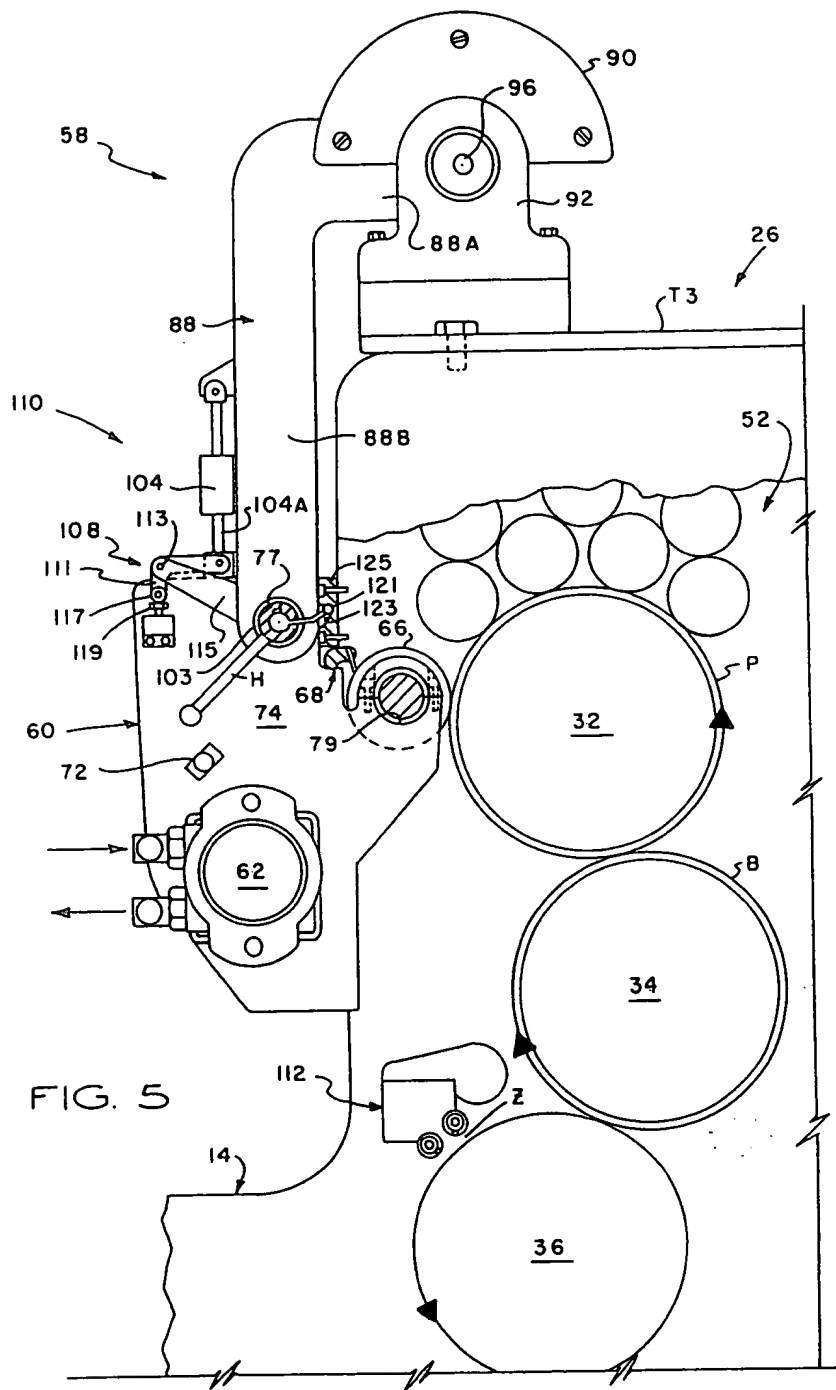


FIG. 6

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Patent Office

Ogilvy & Company
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T5J 3N6

Registration Date

October 17, 1996

ENREGISTREMENT - REGISTRATION

1466123

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demande(s) de brevet pour fin
d'enregistrement.

DEMANDES(S) - APPLICATIONS(S)

2175731

A document has been presented to
the Commissioner of Patents for
registration against a patent
and/or an application for patent.

BREVET(S) - PATENT(S)

Guyline Gauthier
Commis aux cessions de brevets - Patent Assignment Clerk



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Canada

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Canada

ASSIGNMENT

We, **RONALD M. RENDLEMAN** and **JOHN W. BIRD**, whose full post office address are (respectively) 4331 Royal Ridge, Dallas, Texas 75229, U.S.A. and 1514 Iroquois Circle, Carrollton, Texas 75007, U.S.A., for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, do hereby assign to **HOWARD W. DEMOORE**, whose full post office address is 10954 Shady Trail, Dallas, Texas, 75230, U.S.A., all our interest in Canada in and to an invention relating to a RETRACTABLE INKING/COATING APPARATUS HAVING FERRIS MOVEMENT BETWEEN PRINTING UNITS, as fully described and claimed


in an application for a patent for such invention, and to all our corresponding right, title and interest in and to any patent which may issue therefor.

SIGNED AT DALLAS,
TEXAS, this 20th day of May, 1996.


RONALD M. RENDLEMAN


WITNESS

SIGNED AT CARROLLTON,
TEXAS, this 20th day of May, 1996.


JOHN W. BIRD


WITNESS

005050-967573160

CERTIFICATE OF WITNESS

I acknowledge that I was personally present and did see RONALD M.

RENDLEMAN, who is personally known to me, duly execute the above assignment
on the date therein set forth.

Signature of Witness Audra Willis

Name of Witness Audra Willis

Address of Witness 8555 Fair Oaks Crossing #503, Dallas TX 75243

CERTIFICATE OF WITNESS

I acknowledge that I was personally present and did see JOHN W.

BIRD, who is personally known to me, duly execute the above assignment on the
date therein set forth.

Signature of Witness Audra Willis

Name of Witness Audra Willis

Address of Witness 8555 Fair Oaks Crossing #503, Dallas TX 75243

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106050-9625TE60

FEE - TAXE	NO. - N°	REGISTRATIONS - ENREGISTREMENTS
100	146673	APPLICANT-DEMANDEUR

PETITION - PETITION	ORIGINAL PATENT - BREVET ORIGINAL
	LETTERS OF ADMINISTRATION - LETTRES D'ADMINISTRATION
DECLARATION - DECLARATION	ASSIGNMENT - CESSION
REPRESENTATIVE - REPRESENTANT	
APPOINTMENT OF AGENT - NOMINATION D'AGENT	
ASSOCIATE AGENT - AGENT ASSOCIE	COMPLETION FEE - TAXE D'ACHEVEMENT
ABSTRACT - PRECIS	PAPERS CORRECT - PAPIERS COMPLETS
SPECIFICATION - MEMOIRE DESCRIPTIF	
	FEES RECEIVED - TAXES REÇUES
	FILED - DEPOT
2nd CLAIM - 2ème REVENDICATION	COMPLETION - EXECUTION
DRAWINGS - DESSINS	REQUEST FOR EXAMINATION DEMANDE D'EXAMEN
	REINSTATEMENT - RETABLISSEMENT
	RESTORATION - RESTAURATION
	FINAL - CONCESSION
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